

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): Steel block for the manufacture of moulds for the injection moulding of plastics material or the moulding of metals or for the manufacture of metal-working parts, having a thickness greater than 20 mm, of which the structure is completely martensitic or martensite-bainitic, of which the hardness at all points is between 430 HB and 530 HB and of which the chemical composition of the steel comprises, in % by weight:

$$0.180\% \leq C \leq 0.400\%$$

$$Si < 0.15\%$$

$$Mn \leq 2.5\%$$

$$Ni \leq 3\%$$

$$Cr \leq 3.5\%$$

$$Mo + W/2 \leq 2.8\%$$

$$V + Nb/2 + Ta/4 \leq 0.5\%$$

$$Al \leq 0.4\%$$

$$Ti + Zr/2 \leq 0.1\%$$

– boron in a content of between 0.0005% and 0.015%,

- optionally one or more elements from among sulphur, selenium and tellurium, the sum of contents of these elements being less than or equal to 0.2%,
 - optionally one or more elements from among lead and bismuth, the sum of contents of these elements being less than or equal to 0.2%,
 - optionally calcium in a content of less than or equal to 0.1%,
- the remainder being iron and impurities resulting from production, the copper being an impurity, the chemical composition also satisfying the following equations:

$$3.2 \leq \text{Tr} \leq 9$$

$$85 \leq \text{Dr} \leq 95$$

$$\text{U}/\text{Dr} \leq 10.0$$

$$\text{Mo}^* + 3\text{xV}^* \geq 0.4\%$$

in which, for contents expressed in %:

$$\text{Tr} = 1.8\text{xC} + 1.1\text{xMn} + 0.7\text{xNi} + 0.6\text{xCr} + 1.6\text{xMo}^* + \text{K}$$

wherein $\text{K} = 0$ if the steel does not contain boron and $\text{K} = 0.5$ if the steel contains boron

$$\text{Dr} = 54\text{xC}^{0.25} + 24.5\text{x}(\text{Mo}^* + 3\text{xV}^*)^{0.30} + 1.58\text{xMn} + 0.74\text{xNi} + 1.8\text{xSi} + 12.5\text{x}(\text{Cr})^{0.20}$$

$$\text{U} = 1600\text{xC} + 100\text{x}(0.25\text{xCr} + \text{Mo}^* + 4.5\text{xV}^*)$$

$$\text{R} = 3.8\text{xC} + 10\text{xSi} + 3.3\text{xMn} + 2.4\text{xNi} + 1.4\text{x}(\text{Cr} + \text{Mo}^*)$$

$$\text{Mo}^* = \text{Mo} + \text{W}/2$$

$$\text{V}^* = \text{V} + \text{Nb}/2 + \text{Ta}/4$$

the contents of boron, aluminium, titanium, zirconium and nitrogen, expressed in thousandths of % by weight, being such that:

$$B \geq \frac{1}{3} \times K1 + 0.5$$

wherein $K1 = \text{Min}(I^*; J^*)$

$$I = \text{Min}(N; N - 0.29(Ti + Zr/2 - 5))$$

$$I^* = \text{Max}(0; I) \text{ and } J^* = \text{Max}(0; J)$$

$$J = \text{Min} \left(N; 0.5 \left(N - 0.52 Al + \sqrt{(N - 0.52 Al)^2 + 283} \right) \right)$$

2. (original): Steel block according to claim 1, of which the chemical composition is such that

$$R > 11$$

3. (previously presented): Steel block according to claim 1, characterised in that

$$R \leq 2.7 \times Tr$$

4. (previously presented): Steel block according to claim 1, characterised in that the carbon content is less than or equal to 0.35 % by weight.

5. (previously presented): Steel block according to claim 1, characterised in that $R/(2.7 \times Tr) \leq 0.90$.

6. (original): Steel block according to claim 5, characterised in that $R/(2.7 \times Tr) \leq 0.80$.

7. (previously presented): Steel block according to claim 1, characterised in that $U/Dr < 9.0$.

8. (previously presented): Steel block according to claim 7, characterised in that the composition is such that:

$$0.230\% \leq C \leq 0.350\%$$

$$Si < 0.15\%$$

$$0.1\% \leq Mn \leq 1.8\%$$

$$Ni \leq 2\%$$

$$0.2\% \leq Cr \leq 3\%$$

$$Mo + W/2 \leq 2.5\%$$

$$V + Nb/2 + Ta/4 \leq 0.3\%$$

$$Mo^* + 3xV^* \geq 0.8\%.$$

9. (previously presented): Steel block according to claim 8, characterised in that its composition is such that:

$$0.240\% \leq C \leq 0.320\%$$

$$Si < 0.15\%$$

$$0.1\% \leq Mn \leq 1.6\%$$

$$Ni \leq 2\%$$

$$0.2\% \leq Cr \leq 2.5\%$$

$$0.3\% \leq Mo + W/2 \leq 2.5\%$$

$$V + Nb/2 + Ta/4 \leq 0.3\%$$

$$Mo^* + 3xV^* \geq 1.2\%.$$

10. (previously presented): Steel block according to claim 8, characterised in that $Tr > 4.5$.
11. (previously presented): Steel mould part machined in a block according to claim 1, of which at least a portion of the surface is hardened by nitriding and of which the hardness at all points is between 430 HB and 530 HB.
12. (previously presented): Steel block according to claim 1, wherein $Si \leq 0.13\%$.
13. (previously presented): Steel block according to claim 1, wherein $Si \leq 0.12\%$.
14. (previously presented): Steel block according to claim 1, wherein $Si \leq 0.1\%$.
15. (previously presented): Steel block according to claim 1, wherein $Si \leq 0.05\%$.
16. (new): Steel block according to claim 1, wherein the hardness at all points is between 462 HB and 530 HB.